Land-Tech
LANDFILL TECHNOLOGIES OF ARECIBO, LLC.

February 19, 2018.

Donald Frankel
Senior Counsel
Environmental Enforcement Section
Department of Justice
Suite 616
One Gateway Center
Newton, MA 02458
*By email to donald.frankel@usdoj.gov and certified mail number 7017 1450 0000 7575 9855*

**RE: CAA SEMIANNUAL REPORT**
**UNITED STATES V. LANDFILL TECHNOLOGIES OF ARECIBO, CORP.**
**CONSENT DECREE CIVIL NO. 3:14-CV-01438;**
**DOJ CASE NO. 90-5-2-1-09629.**

Dear Mr. Frankel:

Pursuant to Section VI, CAA Injunctive Relief, of the Consent Decree Civil No. 3:14-cv-01438, Landfill Technologies of Arecibo, LLC[1] (LTA), submits the following information:

1. Calibrations of the equipment used to monitor data. *Exhibit 1.*

2. Surface Methane Gas Monitoring, Quarterly Event Report: July to September 2017. *Exhibit 2*

[1] Previously, Landfill Technologies of Arecibo, Corp.

3. Surface Methane Gas Monitoring, Quarterly Event Report: October to December 2017. *Exhibit 3.*

4. Monthly Monitoring, Gas Extraction Wells: July to December 2017. *Exhibit 4.*

5. Start Up, Shut Down and Malfunction Report: July to December 2017. *Exhibit 5.*

Regarding several of the requirements herein included LTA brings to the attention of the EPA and DOJ the letter dated November 9, 2017, regarding Arecibo's official notice under the force majeure paragraph of the Consent Decree. *Exhibit 6.*

If additional information is required, please don't hesitate to contact LTA at your convince at 787-273-7639 or via email, Javier Vázquez, Esq. jvazquez@landfillpr.com; Maribelle Marrero, mmarrero@landfillpr.com.

Best Regards,

Javier J. Vázquez Bravo, ESQ.
Vice-president of Operations

Cc. United States Department of Justice,
Chief Environmental Enforcement Section

EPA, CAA
Certified mail number: 7017 1450 0000 7575 9862

EPA RCRA,
Carl Plössl;

EPA ORC,
Carolina Jordan-Garcia, Esq.;
Certified mail number: 7017 1450 0000 7575 9879

EQB,
Eng. Luis Sierra

PRLA,
Alberto L. Ramos.

Arecibo Municipality
Mayor

# EXHIBIT 1

EQUIPMENT CALIBRATIONS

flare #1

SAGE METERING INC.

# PRODUCT QUALITY CERTIFICATE OF CONFORMANCE

## Product Inspection & Quality Statement

All individual parts and components which make up the product being provided have been inspected and approved for manufacture. In addition, subassemblies have been inspected, tested, and accepted for final assembly. Each completed assembly has been final tested and approved for shipment.

## Conformance Statement

SAGE Metering Incorporated certifies this instrument was tested in compliance with ANSI/NCSL Z540 and ISO/IEC 17025 requirements. SAGE Metering, Inc. calibration services are derived from MIL-STD-45662A. The Prime DC24 model is Met Labs approved and Met Labs is a Nationally Recognized Testing Laboratory (NRTL) which is recognized by OSHA. The tests are performed using measuring & test equipment with certified NIST traceability. (Applicable NIST numbers are available upon request). Reproduction of the complete certificate is allowed. Parts of the certificate may only be reproduced after written permission is granted by SAGE Metering, Inc.

| | | |
|---|---|---|
| CUSTOMER: | Excellent Engineering | |
| PURCHASE ORDER: | RMA 178232 | |
| SAGE SALES ORDER: | 22231 | |
| MODEL: | SIP-05-12-DC24-BIOGAS | |
| POWER REQUIREMENT: | DC24 | |
| OPTIONAL OUTPUT: | Flow, 4 - 20mA | 100 SCF/PULSE, 250 ms |
| SAGE UNIT/SENSOR SERIAL NUMBERS: | 72551-38876 | Slave ID = 31 HEX |
| TAG: | | |
| PRIME BAUD RATE / PRIME PARITY | 19200.00 | EVEN |
| SUGGESTED CALIB/VALIDATION INTERVAL: | 12 months after Calibration | |
| CALIBRATION DATE: | 1/27/2017 | |
| OPERATING PRESSURE RANGE: | (14.7 PSIA + PSIG) ± 20% | |
| MAXIMUM PRESSURE RATING: | 500 PSIG | |
| SENSOR TEMPERATURE RANGE: | STD: -40 to 200 F | |
| ELECTRONICS TEMPERATURE RANGE: | 0° to +150°F (-18° to +65.56°C) | |
| ACCURACY AT THE NORMAL 100:1 TURNDOWN: | +/- 1% Rdg + 0.5% FS | |
| CALIBRATION REFERENCE CONDITIONS: | 70°F and 29.92" Hg | |
| PROCESS GAS / PROCESS GAS SPECIFIC GRAVITY | BIOGAS: (58% CH4, 38% C02, 0.9416 | |
| PROCESS FLOW (FS, 4-20 mA)/LowFlowCutoff | 0 - 1000 SCFM | |
| CALIBRATED FLOW | 1000 SCFM | |
| PROCESS LINE SIZE | 6 In sch 10 | |
| PROCESS TEMPERATURE: | 120 F | |
| PROCESS PRESSURE: | 60 INH2OG | |
| CALIBRATION TECHNICIANS: | Gabe Flores | |
| ROOTS METERs | 8C175 - SN 1628163; 23M232 - SN 1623164 | |

SPECIAL NOTES:

| | | |
|---|---|---|
| SOFTWARE REV# | 2.06 | |
| AMBIENT AIR ZERO In mW/GAS FLOW ZERO In mW | 76 | 80 |

Authorization: Kyle Lyle Date: January 27, 2017

Sage Metering, Inc / 8 Harris Ct / Building D1 / Monterey, CA 93940 / 866-677-SAGE / 831-242-2030 / Fax 831-655-4965 / www.sagemetering.com

SAGE METERING INC.

# Calibration Certificate

**SAGE Sales Number:** 22231
**SAGE Serial Number:** 72551
**Sensor SN:** 38876
**Model:** SIP-05-12-DC24-BIOGAS
**4-20mA:** 1,000 SCFM
**Process Line Size:** 6 in sch 10
**Process Area:** 0.2204 ft²

**Date:** 1/27/2017
**Customer:** Excellent Engineering
**Process Gas:** l4, 38% C02, 3.6% N2, .
**Process Temperature:** 120F
**Process Pressure:** 60 INH2OG

| Flow Meter Non-linear mW Output | Measured Flow | Output Signal 4-20 mA | Indicated Flow (Display Reading) | Deviation | Allowable Deviation | Result |
|---|---|---|---|---|---|---|
| mW | SCFM | 4 - 20 mA | SCFM | SCFM | +/-1% Rdg + ½% Full Scale | Pass / Fail |
| 80 | 0.0 | 4.00 | 0.0 | 0.0 | 5.000 | Pass |
| 210 | 101.1 | 5.64 | 101.0 | -0.1 | 6.011 | Pass |
| 300 | 307.4 | 8.88 | 306.0 | -1.4 | 8.074 | Pass |
| 353 | 497.9 | 11.90 | 493.0 | -4.9 | 9.979 | Pass |
| 400 | 715.4 | 15.17 | 704.0 | -11.4 | 12.154 | Pass |
| 428 | 858.5 | 17.45 | 850.0 | -8.5 | 13.585 | Pass |

Authorization: Kyle Lyle

Date: 1-31-2017

**SAGE Metering Incorporated certifies this instrument was tested in compliance with ANSI/NCSL Z540 and ISO/IEC 17025 requirements. The tests are performed using measuring & test equipment with certified NIST traceability. (Applicable NIST numbers are available upon request). Authorization signature verifies the performance of this instrument meets the intended, published accuracy targets of the manufacturer. Reproduction of the complete certificate is allowed. Parts of the certificate may only be reproduced after written permission is granted by SAGE Metering, Inc.**

Sage Metering, Inc / 8 Harris Ct / Building D1 / Monterey, CA 93940 / 866-677-SAGE / 831-242-2030 / Fax 831-655-4965 / www.sagemetering.com

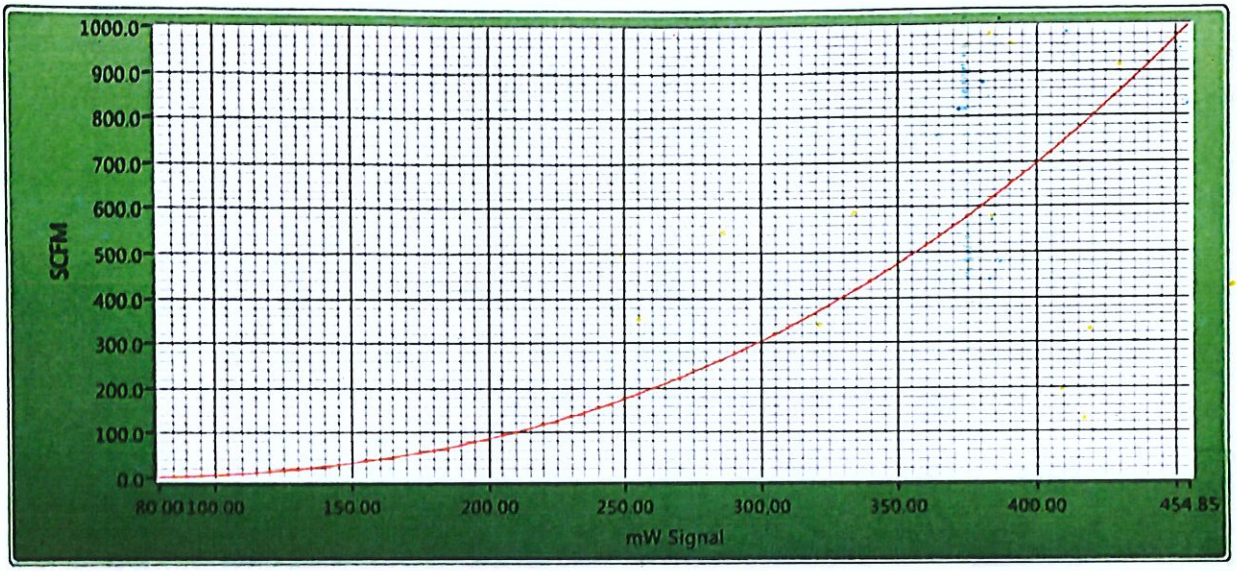
Date: 1/30/2017

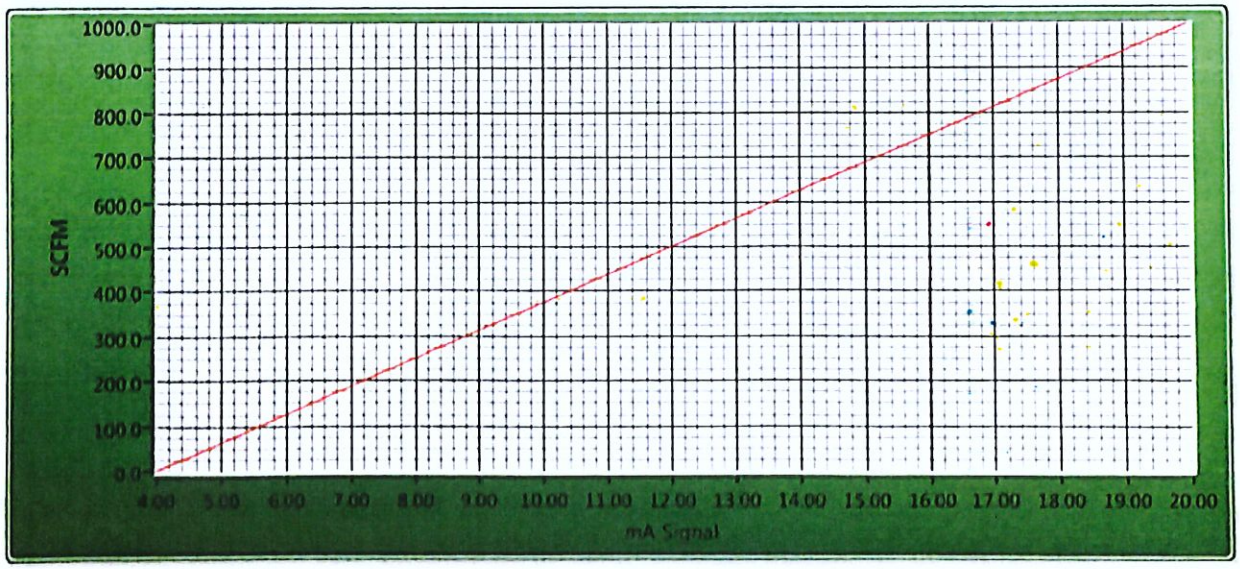
SAGE METERING, INC.

## SAGE CALIBRATION DATA

mW0 Air: 76.0

mW0 Gas: 80.0




Meter Full Scale: 1000 SCFM

Serial #: 72551

Customer: Excellent Engineering

Model: SIP-05-12-DC24-BIOGAS

STP Conditions: 70°F and 29.92" Hg

Signature:

flare #2

SAGE METERING INC.

# PRODUCT QUALITY CERTIFICATE OF CONFORMANCE

## Product Inspection & Quality Statement

All individual parts and components which make up the product being provided have been inspected and approved for manufacture. In addition, subassemblies have been inspected, tested, and accepted for final assembly. Each completed assembly has been final tested and approved for shipment.

## Conformance Statement

SAGE Metering Incorporated certifies this instrument was tested in compliance with ANSI/NCSL Z540 and ISO/IEC 17025 requirements. SAGE Metering, Inc. calibration services are derived from MIL-STD-45662A. The Prime DC24 model is Met Labs approved and Met Labs is a Nationally Recognized Testing Laboratory (NRTL) which is recognized by OSHA. The tests are performed using measuring & test equipment with certified NIST traceability. (Applicable NIST numbers are available upon request). Reproduction of the complete certificate is allowed. Parts of the certificate may only be reproduced after written permission is granted by SAGE Metering, Inc.

| | | |
|---|---|---|
| CUSTOMER: | Excellent Engineering | |
| PURCHASE ORDER: | PO 217081 RMA 181303 | |
| SAGE SALES ORDER: | 22640 | |
| MODEL: | SIP-05-12-DC24-BIOGAS | |
| POWER REQUIREMENT: | DC24 | |
| OPTIONAL OUTPUT: | Flow, 4 - 20mA | 100 SCF/PULSE, 250 ms |
| SAGE UNIT/SENSOR SERIAL NUMBERS: | 85117-44527 | Slave ID = 31 HEX |
| TAG: | | |
| PRIME BAUD RATE / PRIME PARITY | 19200.00 | EVEN |
| SUGGESTED CALIB/VALIDATION INTERVAL: | 12 months after Calibration | |
| CALIBRATION DATE: | 3/14/2017 | |
| OPERATING PRESSURE RANGE: | (14.7 PSIA + PSIG) ± 20% | |
| MAXIMUM PRESSURE RATING: | 500 PSIG | |
| SENSOR TEMPERATURE RANGE: | STD: -40 to 200 F | |
| ELECTRONICS TEMPERATURE RANGE: | 0° to +150°F (-18° to +65.56°C) | |
| ACCURACY AT THE NORMAL 100:1 TURNDOWN: | +/- 1% Rdg + 0.5% FS | |
| CALIBRATION REFERENCE CONDITIONS: | 70°F and 29.92" Hg | |
| PROCESS GAS / PROCESS GAS SPECIFIC GRAVITY | BIOGAS: (58% CH4, 38% CO2, 0.9416 | |
| PROCESS FLOW (FS, 4-20 mA)/LowFlowCutoff | 0 - 1000 SCFM | |
| CALIBRATED FLOW | 1000 SCFM | |
| PROCESS LINE SIZE | 6 in sch 10 | |
| PROCESS TEMPERATURE: | 120 F | |
| PROCESS PRESSURE: | 60 INH2OG | |
| CALIBRATION TECHNICIANS: | GF | |
| ROOTS METERs | 8C175 - SN 1628163; 23M232 - SN 1623164 | |

SPECIAL NOTES:

| | | |
|---|---|---|
| SOFTWARE REV# | 2.09 | |
| AMBIENT AIR ZERO in mW/GAS FLOW ZERO in mW | 72 | 75 |

Authorization: Tyler Tyler Date: March 14, 2017

Sage Metering, Inc / 8 Harris Ct / Building D1 / Monterey, CA 93940 / 866-677-SAGE / 831-242-2030 / Fax 831-655-4965 / www.sagemetering.com

# As Found Calibration Certificate

SAGE Sales Number: 22640
SAGE Serial Number: 85117
Sensor SN: 44527
Model: SIP-05-12-DC24-BIOGAS
4-20mA: 60,000.00 SCFH
Process Line Size: 6 in sch 10
Process Area: 0.1529 ft²

Date: 3/13/2017
Customer: Excellent Engineering
Process Gas: BIOGAS: (50% CH4, 47
Process Temperature: 125F
Process Pressure: 3 PSIG

| Flow Meter Non-linear mW Output | Measured Flow | Output Signal 4-20 mA | Indicated Flow (Display Reading) | Deviation | Allowable Deviation | Result |
|---|---|---|---|---|---|---|
| mW | SCFH | 4 - 20 mA | SCFH | SCFH | +/-1% Rdg + ½% Full Scale | Pass / Fail |
| 72 | 0.0 | 4.00 | 0.0 | 0.0 | 300.000 | Pass |
| 236 | 8329.3 | 5.93 | 7204.0 | -1125.3 | 383.293 | Fail |
| 298 | 16817.0 | 7.89 | 14739.0 | -2078.0 | 468.170 | Fail |
| 343 | 25437.1 | 9.80 | 21884.0 | -3553.1 | 554.371 | Fail |
| 361 | 29536.6 | 10.67 | 25159.0 | -4377.6 | 595.366 | Fail |
| 389 | 35774.9 | 12.10 | 30709.0 | -5065.9 | 657.749 | Fail |

Authorization: _____ Date: 3-15-2017

SAGE Metering Incorporated certifies this instrument was tested in compliance with ANSI/NCSL Z540 and ISO/IEC 17025 requirements. The tests are performed using measuring & test equipment with certified NIST traceability. (Applicable NIST numbers are available upon request). Authorization signature verifies the performance of this instrument meets the intended, published accuracy targets of the manufacturer. Reproduction of the complete certificate is allowed. Parts of the certificate may only be reproduced after written permission is granted by SAGE Metering, Inc.

Sage Metering, Inc / 8 Harris Ct / Building D1 / Monterey, CA 93940 / 866-677-SAGE / 831-242-2030 / Fax 831-655-4965 / www.sagemetering.com

SAGE METERING INC.

# Calibration Certificate

SAGE Sales Number: 22640
SAGE Serial Number: 85117
Sensor SN: 44527
Model: SIP-05-12-DC24-BIOGAS
4-20mA: 1,000 SCFM
Process Line Size: 6 in sch 10
Process Area: 0.1529 ft²

Date: 3/14/2017
Customer: Excellent Engineering
Process Gas: 4, 38% CO2, 3.6% N2, .
Process Temperature: 120F
Process Pressure: 60 INH2OG

| Flow Meter Non-linear mW Output | Measured Flow | Output Signal 4-20 mA | Indicated Flow (Display Reading) | Deviation | Allowable Deviation | Result |
|---|---|---|---|---|---|---|
| mW | SCFM | 4 - 20 mA | SCFM | SCFM | +/-1% Rdg + ½% Full Scale | Pass / Fail |
| 75 | 0.0 | 4.00 | 0.0 | 0.0 | 5.000 | Pass |
| 203 | 79.0 | 5.20 | 75.2 | -3.9 | 5.790 | Pass |
| 278 | 211.1 | 7.24 | 208.0 | -3.1 | 7.111 | Pass |
| 330 | 352.9 | 9.40 | 349.7 | -3.2 | 8.529 | Pass |
| 372 | 492.4 | 11.64 | 482.9 | -9.5 | 9.924 | Pass |
| 400 | 589.8 | 13.24 | 585.8 | -3.9 | 10.898 | Pass |

Authorization: Kyle Tyler Date: 3-16-2017

**SAGE Metering Incorporated certifies this instrument was tested in compliance with ANSI/NCSL Z540 and ISO/IEC 17025 requirements. The tests are performed using measuring & test equipment with certified NIST traceability. (Applicable NIST numbers are available upon request). Authorization signature verifies the performance of this instrument meets the intended, published accuracy targets of the manufacturer. Reproduction of the complete certificate is allowed. Parts of the certificate may only be reproduced after written permission is granted by SAGE Metering, Inc.**

Sage Metering, Inc / 8 Harris Ct / Building D1 / Monterey, CA 93940 / 866-677-SAGE / 831-242-2030 / Fax 831-655-4965 / www.sagemetering.com

# CERTIFICATION OF CALIBRATION

ISSUED BY: QED Environmental Systems, Inc. Services Facility

Date Of Calibration: February 8, 2017

Certificate Number: GM13655_10/31439

PJLA Calibration

No. 66916



Approved By Signatory

Dan McCarty

Laboratory Inspection

LANDTEC

QED Environmental Systems, Inc. Services Facility,
2355 Bishop Circle West, Dexter, MI 48130
www.qedenv.com

***Customer:*** ***Diamond Scientific***

55 East Broad St.
Titusville FL 32796
USA

***Description:*** Gas Analyser

***Model:*** GEM2000

***Serial Number:*** GM13655

**Accredited Results:**

| Methane (CH4) | | |
|---|---|---|
| Certified Gas (%) | Instrument Reading (%) | Uncertainty (%) |
| 5.0 | 5.1 | 0.41 |
| 15.0 | 15.1 | 0.65 |
| 50.0 | 49.7 | 1.05 |

| Carbon Dioxide (CO2) | | |
|---|---|---|
| Certified Gas (%) | Instrument Reading (%) | Uncertainty (%) |
| 5.0 | 4.8 | 0.43 |
| 15.0 | 14.7 | 0.71 |
| 50.0 | 49.7 | 1.20 |

| Oxygen (O2) | | |
|---|---|---|
| Certified Gas (%) | Instrument Reading (%) | Uncertainty (%) |
| 20.7 | 20.7 | 0.25 |

Gas cylinders are traceable and details can be provided if requested.

CH4, CO2 readings recorded at: 32.1 °C/89.8 °F

O2 readings recorded at: 22.2 °C/71.9 °F

Barometric Pressure: 28.89 "Hg

Method of Test: The analyzer is calibrated in a temperature controlled chamber using reference gases. All analyzers are calibrated in accordance with our procedure ISP-17 using high purity grade gas.

All calibrations are performed in accordance with ISO 17025 at LANDTEC, an ISO 17025:2005 – accredited service facility through PJLA.

*The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with NIST requirements.*

# CERTIFICATION OF CALIBRATION

PJLA ACCREDITED CALIBRATION LABORATORY NO. 66916

Certificate Number
GM13655_10/31439



**Non Accredited results:**

| Pressure Transducers (inches of water column) | | | | | |
|---|---|---|---|---|---|
| Transducer | Certified (Low) | Reading (Low) | Certified (High) | Reading (High) | Accuracy |
| Static | 0" | 0.0" | 40" | 39.7" | 2.0" |
| Differential | 0" | 0.0" | 4" | 4.0" | 0.7" |

| Barometer (mbar) | |
|---|---|
| Reference | Instrument Reading |
| 0978 mbar / 28.89 "Hg | 0978 mbar / 28.89 "Hg |

As received gas check readings:

| Methane (CH4) | |
|---|---|
| Certified Gas (%) | Instrument Reading (%) |
| 5.0 | 5.5 |
| 15.0 | 15.7 |
| 50.0 | 51.1 |

| Carbon Dioxide (CO2) | |
|---|---|
| Certified Gas (%) | Instrument Reading (%) |
| 5.0 | 5.3 |
| 15.0 | 15.3 |
| 50.0 | 49.3 |

| Oxygen (O2) | |
|---|---|
| Certified Gas (%) | Instrument Reading (%) |
| 20.7 | 19.5 |

As received Gas readings recorded at: 32.1 °C/89.8 °F
As received Barometric Pressure recorded at: 22.2 °C/71.9 °F

End of Certificate

# CERTIFICATION OF CALIBRATION

ISSUED BY: QED Environmental Systems, Inc. Services Facility

Date Of Calibration: August 1, 2017

Certificate Number: G503692_10/32602

PJLA Calibration

No. 66916



Approved By Signatory

Jordan Kalmbach

Laboratory Inspection

LANDTEC

QED Environmental Systems, Inc. Services Facility,
2355 Bishop Circle West, Dexter, MI 48130
www.qedenv.com

***Customer:*** ***Diamond Scientific LLC***

PO BOX 348
Mims, FL 32754
USA

***Description:*** Gas Analyser ***Model:*** GEM5000

***Serial Number:*** G503692

**Accredited Results:**

| Methane (CH4) | | |
|---|---|---|
| **Certified Gas (%)** | **Instrument Reading (%)** | **Uncertainty (%)** |
| 5.0 | 4.9 | 0.42 |
| 15.0 | 14.9 | 0.66 |
| 50.0 | 49.6 | 1.03 |

| Carbon Dioxide (CO2) | | |
|---|---|---|
| **Certified Gas (%)** | **Instrument Reading (%)** | **Uncertainty (%)** |
| 5.0 | 4.9 | 0.43 |
| 15.0 | 15.0 | 0.71 |
| 50.0 | 50.7 | 1.19 |

| Oxygen (O2) | | |
|---|---|---|
| **Certified Gas (%)** | **Instrument Reading (%)** | **Uncertainty (%)** |
| 20.7 | 20.7 | 0.25 |

Gas cylinders are traceable and details can be provided if requested.

CH4, CO2 readings recorded at: 32.2 °C/90.0 °F Barometric Pressure: 29.13 "Hg

O2 readings recorded at: 22.7 °C/72.9 °F

Method of Test: The analyzer is calibrated in a temperature controlled chamber using reference gases. All analyzers are calibrated in accordance with our procedure ISP-17 using high purity grade gas.

All calibrations are performed in accordance with ISO 17025 at LANDTEC, an ISO 17025:2005 – accredited service facility through PJLA.

*The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with NIST requirements.*

# CERTIFICATION OF CALIBRATION

PJLA ACCREDITED CALIBRATION LABORATORY NO. 66916

Certificate Number
G503692_10/32602



**Non Accredited results:**

| Pressure Transducers (inches of water column) | | | | | |
|---|---|---|---|---|---|
| **Transducer** | **Certified (Low)** | **Reading (Low)** | **Certified (High)** | **Reading (High)** | **Accuracy** |
| Static | 0" | 0.00" | 40" | 40.25" | 2.0" |
| Differential | 0" | 0.00" | 4" | 4.18" | 0.7" |

| Barometer (mbar) | |
|---|---|
| **Reference** | **Instrument Reading** |
| 0986 mbar / 29.13 "Hg | 0988 mbar / 29.18 "Hg |

| Additional Gas Cells | | |
|---|---|---|
| **Gas** | **Certified Gas (ppm)** | **Instrument Reading (ppm)** |
| CO | 501 | 495 |
| H2S | 203.5 | 202 |

As received gas check readings:

| Methane (CH4) | |
|---|---|
| **Certified Gas (%)** | **Instrument Reading (%)** |
| 5.0 | 5.2 |
| 15.0 | 15.4 |
| 50.0 | 48.9 |

| Carbon Dioxide (CO2) | |
|---|---|
| **Certified Gas (%)** | **Instrument Reading (%)** |
| 5.0 | 5.1 |
| 15.0 | 15.1 |
| 50.0 | 51.1 |

| Oxygen (O2) | |
|---|---|
| **Certified Gas (%)** | **Instrument Reading (%)** |
| 20.7 | 19.4 |

As received Gas readings recorded at: 32.2 °C/90.0 °F
As received Barometric Pressure recorded at: 22.7 °C/72.9 °F

End of Certificate

# SERVICE REPORT

**Thermo Environmental Instruments, Inc**
27 Forge Parkway
Franklin, MA. 02038
Phone: 866-282-0430
Fax: 508-520-2800

| RA# | DATE COMPLETED |
|---|---|
| RA00080775 19499 | 7/17/2017 2:31 PM |
| **CUSTOMER** | **CONTACT PHONE** |
| Landfill Technologies Corp. | (787) 273-7639 x298 |
| **CONTACT** | **CONTACT EMAIL** |
| Cynthia Otero | cotero@landfillpr.com |
| **MODEL** | **SERIAL NUMBER** |
| TVA1000 | 0115247987 |

**REPORT SUBMITTED BY**
Contact: Mark Vigneaux
Email: mark.vigneaux@thermofisher.com

**SUBJECT:** tva1000 **REPAIR TYPE:** Time and Material **PRIORITY:** Standard

**DESCRIPTION OF SERVICE REQUIRED:** calibration

**CONTAMINATED/HAZARDOUS:** No
**DECONTAMINATION METHOD:** N/A

**ACCESSORIES RECEIVED:** Battery; Case; Charger; Probe; Strap / Battery cable, Refill assembly, H2 tank, Tool kit, RS232 adapter, Charcoal filter, Telescoping probe

**PHYSICAL INSPECTION** (inspected for damage, missing items, pm required, cleanliness, and accuracy)

- ✓ Compare unit to RA detail
- ✓ Labeling
- ✓ Warranty Label Intact: Y
- ✓ Last Service Date: 3/2016
- ✓ H2 Tank: Y
- ✓ H2 Tank Expiration Date: 4/2025
- ✓ Hardware
- ✓ Probe Cables and Connectors
- ✓ Battery Door Lock
- ✓ Battery Information: 11/4/14 7.3v (OOB), 8.0v (FC)

**RECEIVED CONDITION: Fair / Unit is dirty and shows normal wear and tear for application.**

**CUSTOMER CAL DATA**

| Detector | Cal Zero Counts | Cal Span Counts | Span Concentration (ppm) | Response Factor |
|---|---|---|---|---|
| FID | 4512 | 91317 | 500 | Default |

**INSTRUMENT AS FOUND:** Low flows. High ambient zero counts.

**FLOWS AS FOUND**

| Sample Flow (ml/min) | FID Flow (ml/min) | H2 Pressure (psi) | H2 Flow (ml/min) |
|---|---|---|---|
| 837 | 313 | 12.0 | 13.38 |

**PREVENTATIVE MAINTENANCE** (replacement or maintenance of checked items below as required *may not be all inclusive*)

- ✓ O-rings
- ✓ Pump Assembly
- ✓ Filter
- ✓ Hardware

# SERVICE REPORT

**Thermo Environmental Instruments, Inc**
27 Forge Parkway
Franklin, MA. 02038
Phone: 866-282-0430
Fax: 508-520-2800

**REPAIR NOTES:** Low flows - cleaned and adjusted the pump. High ambient zero counts - cleaned the inside the jet with methanol. Wont light - replaced thermocouple. Performed preventative maintenance and cleaning of unit as required. Replaced defective parts listed. Set all proper flows tested and calibrated.

**FLOWS AS LEFT**

| Sample Flow (ml/min) | FID Flow (ml/min) | H2 Pressure (psi) | H2 Flow (ml/min) |
|---|---|---|---|
| 1141 | 426 | 12.0 | 13.38 |

**PARTS AND LABOR:**

| Product | Quantity | Line Description |
|---|---|---|
| 510318-1 | 1.00 | Cup filter |
| CR012HJ | 1.00 | Splitter body |
| LBR-IH PORT TEI | 3.00 | Labor |
| TR103AD | 1.00 | Ferrule, Back |
| TR103AE | 1.00 | Ferrule, Front |
| TR201GQ | 1.00 | Thermocouple |
| X0201CD | 1.00 | Splitter o-ring |

**TEST EQUIPMENT AND SOURCES USED:** Fluke Digital Voltmeter, Brooks Flow Meter, Model 146 Dilution Calibrator, Methane Gas Standards

All measurement standards are calibrated at scheduled intervals by the National Institute of Standards and Technology (NIST), or against certified standards, which are traceable to the National Institute of Standards and Technology, formally the National Bureau of Standards (NBS). Calibration of customer equipment is performed with appropriate environmental controls, as required.

**PASSED HYDROGEN LEAK TEST** YES

**INITIAL CALIBRATION**

| Detector | Cal Zero Counts | Cal Span Counts | Span Concentration (ppm) | Response Factor |
|---|---|---|---|---|
| FID | 3941 | 120858 | 500 | Default |

**DRIFT TEST**

| Detector | Hour 1 Reading (ppm) | Hour 4 Reading (ppm) | Delta (ppm) | Tolerance |
|---|---|---|---|---|
| FID | **2.13** | **2.93** | **0.8** | ≤ 1 ppm Delta |

**H2 RUN TIME TEST**

| Starting H2 psi | Run Time | Tolerance |
|---|---|---|
| 2000 | 12 | ≥ 1 hour run time per 200 psi of H2 |

# SERVICE REPORT

**Thermo Environmental Instruments, Inc**
27 Forge Parkway
Franklin, MA. 02038
Phone: 866-282-0430
Fax: 508-520-2800

**FINAL CALIBRATION**

| Detector | Cal Zero Counts | Cal Span Counts | Span Concentration (ppm) | Response Factor |
|---|---|---|---|---|
| FID | 4035 | 118968 | 500 | Default |

**REPEATABILITY TEST**

| FID | 1ST Check | 2ND Check | 3RD Check | Final Check | Tolerance |
|---|---|---|---|---|---|
| 500 PPM | 505 | 499 | 506 | 501 | ± 10% |

**CALIBRATION CONCENTRATION TEST**

| Detector | Calibration Gas | Concentration(ppm) | TVA actual reading (ppm) | Tolerance (ppm) |
|---|---|---|---|---|
| FID | Zero Air | 0 | -0.04 | ≤ 3 |
| FID | Methane | 100 | 100 | ± 25 |
| FID | Methane | 500 | 502 | ± 125 |
| FID | Methane | 10000 | 1.13% | ±2500 |

**PRE-BUTTON UP INSPECTION**

- ✓ Tubing is secured and not crimped (where applicable).
- ✓ Serial Number/Voltage Labels intact and legible.
- ✓ Instrument cleaned.
- ✓ All hardware is secured. (Ex. Screws, connectors, tubing, etc.)
- ✓ Battery door lock tight
- ✓ Cables secured and Tie wrapped where applicable
- ✓ No loose debris within the instrument closure. (Screws, washers tubing, tywraps, etc.)
- ✓ Make sure TVA does not flame out when bumped.
- ✓ Remove sample line – TVA should **NOT** flame out. Leave off for 5 minutes minimum.
- ✓ Check battery voltage without charger being plugged in.
- ✓ Perform quick cal check with 10,000 ppm gas and insure spec. is met (90% of reading in 3.5 seconds up and 10% of reading in 20 seconds down)

**FINAL QC CHECKLIST**

- ✓ Serial Number/Voltage Labels intact and legible.
- ✓ Instrument cleaned.
- ✓ Service Report and Calibration Report created for unit
- ✓ All received customer accessories accounted for and clearly identified.
- ✓ Instrument turns on.
- ✓ Ignition test (TVA models).
- ✓ Calibration labels/Report with instrument.
- ✓ Bill To/Ship to information properly indicated on CO.
- ✓ Quantities correct and complete on CO.

**INSTRUMENT AS LEFT:** Unit performs fully to manufacturer specifications.